

Appln. No.: 10/779,973
Amendment Dated October 18, 2005
Reply to Office Action of July 18, 2005

GRY-117US

Remarks/Arguments:**Amendment**

Upon entry of the above amendments, claims 1-17 will be pending in the present application. Applicants have amended claims 1-8 to clarify the present invention. The specification on page 3 and Figures 3b and 3a support the amendment to claim 1. New claims 9-17 find support in the originally filed claims, at page 3 and in figure 3a. Specifically, new claim 10 finds support in figure 3a. Applicants have not introduced any new matter. Applicants have further clarified the present invention. Applicants, respectfully, request consideration of the above amendment and following remarks and entry into the record.

Rejections under 35 U.S.C. § 102

Claims 1-5, 7, and 8 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Tsai '667 (US 6,308,667). Applicants respectfully submit the patentable distinction exist between the cited prior art and the present invention.

Distinctions Between the Present Invention and Tsai '667

Tsai '667 discloses an electromechanical valve control actuator comprising two electromagnets driving a magnetic plate the movement of which controls the displacement of the valve. The magnetic plate has one or more teeth extending outward, the teeth being received in corresponding sockets in the cores of the corresponding electromagnets. When the magnetic plate approaches an electromagnet, the teeth provide a magnetic flux path that produces a more constant force of attraction during actuation of the valve.

Tsai '667 fails to disclose the fact that the operation of the valve is linked to the saturation of the magnetic circuit formed by the electromagnet and the plate. Tsai '667 fail to disclose the combination of the saturation of the magnetic circuit when the plate is in proximity of the electromagnet and the non-saturation of the magnetic circuit when the plate is located at a distance from it. The goal of Tsai '667 is to obtain on the whole stroke of the plate, as shown in Figure 3 of Tsai '667, a linear relationship between the force of attraction and the air gap. See curve 42 compared to curve 40. The linearization of the force is obtained by the oblique

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walls of the teeth and the corresponding oblique walls of the electromagnet in Tsai '667. See Figure 4a of Tsai '667.

One of ordinary skill in the art, based on the description provided by Tsai '667, would not understand that the magnetic circuit is in a state of saturation when the magnetic plate is proximate to the electromagnet and in a state of magnetic nonsaturation when the plate is located at a distance from the electromagnet, as required by claim 1. The Examiner has asserted on page 5 of the outstanding office action that Tsai '667 discloses a "device feature" that is attributed to "saturation" as discussed in the present application. Applicants respectfully disagree with the Examiner's assessment. As discussed above, the prior art pursues linearization of the force through oblique walls, which is not the present invention.

The presence of oblique walls (32) in Tsai '667 (figure 4a) has the consequence that the force of attraction between oblique walls is not according to the axis of the rod (14) and is decreased, compared to flat surfaces. The presence of teeth increases the attraction forces, compared to flat surfaces. When one compares figure 3 of Tsai '667 and Figure 4 of the present invention, one sees that for the significant air gap, the operation is the same in the case of the present invention (figure 4 of the application: curves 41-42 are the same). In contrast, in the prior art figure 3, for the significant air gaps, the curve 42 is distinct from curve 40.

The advantage of the present invention is that the shapes of the electromagnet and of the plate are simpler. It is not necessary to provide it with teeth and oblique walls as disclosed in Tsai '667.

Applicants, therefore, respectfully submit that Tsai '667 fails to disclose all of the limitations of claim 1 of the present application, and therefore, fails to anticipate claim 1. Claims 2-5, 7, and 8, being properly dependent from Claim 1, are not anticipated by this reference for at least the same reasons. Applicants respectfully request withdrawal of the 35 U.S.C. §102(b) rejection.

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Rejections under 35 U.S.C. § 103

Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Tsai '667 in view of Rookes '821 (US 5,992,821). Applicants respectfully submit that patentable distinctions exist between the cited prior art and the present invention.

Distinctions Between the Present Invention and Tsai '667 in view of Rookes '821

Rookes '821 discloses an electro-magnetically operated valve in which at least a portion of the armature member and/or the pole piece has in or on it a coating or layer of material having a higher mechanical hardness or a higher magnetic permeability than the material of the armature and/or pole piece. Rookes '821, however, fail to disclose the saturation of the magnetic circuit when the valve is in proximity of the pole piece and the nonsaturation of this circuit when the valve is located at a distance from the same pole piece.

Permeability is a complex function of the applied magnetic field. Increasing magnetization, approaching saturation, produces a decrease in permeability. Rookes '821 only discloses a coating or layer of material with relative low magnetic properties having a specified thickness in order to provide a specified level of magnet remanence in at least the pole. See col. 2, lines 60-67. No where in the Rookes '821 reference is saturation of the magnetic circuit discussed. No where in the Rookes '821 reference is the nonsaturation of the magnetic circuit discussed. Thus, this reference fails to disclose or suggest all the limitations of claim 6 of the present application.

As submitted above, the Tsai '667 fails to disclose or suggest all limitations of claim 1. Applicants respectfully submit that, as since claim 6 is properly dependent from Claim 1, these two references in combination fail to establish a *prima facie* case of obviousness against claim 6 under 35 U.S.C. §103 (a).

Applicants respectfully assert the neither Tsai '667 nor Rookes '821 disclose or suggest the present claimed structure combining saturation for small air gaps and non-saturation for greater air gaps.

In view of the foregoing amendments and remarks, Applicant respectfully request that the Examiner reconsider and withdraw the rejection of claims 1-8.


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Conclusion

Applicants respectfully submit that all outstanding issues have been addressed or rendered moot. Applicants assert that the present application as amended is in good condition for allowance.

Respectfully submitted,


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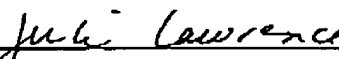
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